Actuarial Science: A Man's Work?

An Honors Thesis (HONRS 499)

by

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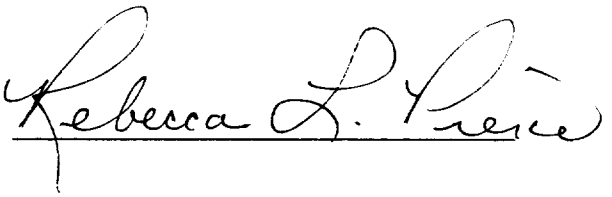

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Abstract

This discussion of the gender gap in mathematics focuses on the field of actuarial science. It is an exploration of the existence and continuance of the disparities between men and women in mathematics, and how it has affected various women in my profession. Finally, there is an analysis of what we can do to close the gender gap. It is an attempt to find out what is in store for future female actuaries like myself.

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Mathematics. The mere word can strike terror in the hearts of many students, not just females. However, it is mostly women that tend to avoid math as a subject of study and as a career. There are many reasons: Mathematics is seen as a male-dominated field, many women do not feel that math is interesting, and many girls simply do not have the background experience and self-confidence to truly achieve at math and other sciences, especially actuarial science. I believe that awareness and self-confidence are the keys to closing the gender gap between men and women in mathematics.

Actuarial science is the mathematics of insurance. Statistics, probability, and finance are combined to maintain and price insurance, pension plans, and other financial investments. Anyone with a strong background in mathematics and a keen business mind can join this secure field at a relatively high level of pay. There are a rigid series of exams that determine an actuary's level of pay and expertise. These exams are administered by the Society of Actuaries. Actuaries can be designated Associates or Fellows of this society, according to the number of exams completed. Unfortunately, the Society of Actuaries does not keep statistics on the number of males and females that have received these designations. However, actuarial science is just one of the careers in mathematics that has failed to attract a high number of female employees.

A girl's experiences in school play a large role in the career that she will choose. When I look back at my experiences during the last sixteen years, I see very few differences in the achievement of males and females. In fact, my school was different. I went to a very small high school with about one hundred people in my graduating class. The top ten students were all females, with the highest male being ranked number eleven or twelve. Most of the math classes were pretty evenly distributed, though there were usually more boys than girls in my physics and chemistry classes. Both sexes enrolled in the traditionally male shop and farm classes, but perhaps that was due to the low level of difficulty. I was lucky to attend a school that was mostly gender-equal. Until taking a course that specifically addressed this issue during my junior year of college, I never gave much thought to gender issues and how they affect us.

Our gender roles and differences are set from the very minute we are born. As baby girls, we are cuddled and rocked, dressed in pretty pink outfits. As we grow a little older, females are fiercely protected. We cannot go as far or explore as much as our male counterparts. We watch and learn from our parents, seeing our mothers wait for dad to fix the car and take out the trash. These little examples we see every day shape our lives. It continues on into elementary school, where boys are called on more often and encouraged to pursue difficult subjects more. Clearly we see males and females treated

differently at all stages of life, but despite these obvious differences, the gender gap in academic performance is beginning to close.

Gender differences and academic performance have been the subjects of countless studies in the past few decades. This awareness is one of the first steps in gender equality, as outlined by Sue Rosser. Though we have made progress down the road of sex-equity, we still have many miles to travel. Before we can continue, however, we must understand the progress that has been made thus far.

In the beginning, mathematics was completely dominated by males. The typical mathematician looked like Albert Einstien, a white man with wild hair and eyeglasses hunched over the latest tedious proof. This image of the asocial mathematician is still prevalent today. How many young girls say "I want to look like that"? Math is considered an objective science and was assumed to be free from bias. However, this was not the case, as Ursula Franklin states:

> "Once we recognize the link between knowledge and understanding we also recognize that knowledge is not neutral, objective or value free. It is impossible to assume that science, technology, mathematics, or any other knowledge-seeking activity is neutral, because search, selection, and construction of new knowledge begins with questions -- and questions arise in a given setting. Questions make sense only in a particular social and political context. ...Scientists are the socially sanctioned fact makers. However, scientists constitute a very small and homogenous social group which in the past was almost entirely male, almost entirely white and schooled in similar settings using similar or identical texts. Yet, as their insights and the results of their research become "facts", they shape

> the whole society. On the other hand, when those who work outside the in-group of scientists -- say women who nurse, cook, or garden -- bring forward observations and insights, however well tested and verified, these contributions rarely achieve the status of facts."

Mathematics has always been influenced by the interest of males. Our knowledge and science have clearly not been objective in the past. Any textbook proves to validate this point. The famous mathematicians introduced throughout texts are almost always male. They are often referred to as the "fathers" of their particular discipline. Recognizing the bias found in mathematics and other sciences is another important step towards gender equity.

Though it is easy to point out differences in the mathematical experiences of boys and girls, the gap in achievement has been steadily narrowing. Part of this progress can be attributed to Title IX, the federal mandate against sex discrimination in education. Passed by Congress in 1972, Title IX has made educational opportunities equally available to both sexes.

> "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving federal financial assistance."
>
> Title IX of the Education Amendment of 1972

Title IX was just one small step down the road towards gender equity, but a new day was ahead. Schools were no longer allowed to exclude women from math and science clubs. Soon,

girls' achievement began to approach that of boys. This game of "catch-up" has been very well documented. The ground-breaking report How Schools Shortchange Girls, published by the American Association for University Women, discusses this trend. "Gender differences in mathematics are small and declining. Recent meta-analyses have found only small differences in female and male performance in mathematics. Furthermore, meta-analyses comparing recent research with studies done in 1974 indicate a significant decline in gender differences." Sex differences in SAT Math scores have declined as well. Female scores went up eleven points between 1978 and 1988, while male scores grew by four points. Males and females were also beginning to participate equally in mathematics. In 1987, female students earned an average of 2.93 credits in mathematics, while their male counterparts earned 3.04 credits. The National Assessment of Educational Progress and the Council of Chief State School Officers agree that "up to Algebra III/Pre-Calculus and Calculus there were no gender differences in either course-taking or average proficiency," (AAUW Report, 43.) Girls clearly have the ability to do well in mathematics, so we must strive to understand the reasons that they are still avoiding it.

During senior high school and college, many women begin to drop out of math. Many cannot see themselves using math as adults. Males and females take the same math courses until calculus, taken by 7.6 percent of boys and only 4.7 percent of girls (AAUW Report, 43.) Though the gap is closing, females

still lag slightly behind males in SAT scores. The SAT is said to underpredict females' scores and overpredict the scores of boys. In 1997, girls scored an average of 494 points on the SAT Math, while males scored 530 points. Much of this can be attributed to the poor math preparation many girls receive in high school. As Linda Marker declares in The Journal of Technological Studies "they have taken so many fewer math and science courses (than their male classmates) that it precludes significant numbers of them from pursuing college science and engineering majors." In college, women make up only 28.5 percent of undergraduate students in the mathematical and physical sciences. This is an improvement from the 19.4 percent in 1971, but pales in comparison to the law and medical professions, where women earn 46.7 and 41.7 percent of bachelor's degrees, respectively (Grevholm and Hanna, 8.) Women are not pursuing higher level mathematics nearly as much as men, and this must be investigated before it can change.

Some schools have seen increases in the number of females pursuing actuarial science as a major. To obtain current statistics, I contacted several universities around the country, including my own. Ball State currently has 34 actuarial science students, 12 of them female. The actuarial science program at Central Missouri State University approaches parity at 10 female students and 12 males. However, this may have been due to the competing computer science program at the school. The computer science program attracts many more students due

to the high level of pay and the lack of a rigid series of exams. One college has actually seen more women than men pass through its program. Florida State University has graduated 51 women and 49 men since it began offering actuarial science as an option in 1993. These figures are heartening, but schools must realize that they need to actively recruit females in mathematics and other fields.

Women have also traditionally avoided math as a career choice. In the 1970's, women made up about five percent of faculty in United States math departments. In 1986, women constituted 49 percent of the workforce but only 24 percent of employed mathematicians, (Mathematics Education Digest, 3.) I spoke with representatives from several insurance companies, and women constituted an average of 32% of their actuarial workforces. Lincoln Life had the lowest average at thirteen percent, compared to CNA Financial Corporation, which boasts an average of sixty percent. Some companies must strive to make themselves more attractive to potential female actuaries.

Salaries are another area of inconsistency between men and women. The 1997 World Almanac reports that American females earn roughly $10,000 less per year than men with equal education. The field of higher education is no exception. Women earn at least $2,600 less than male professors, regardless of level of education. This was not only evident at public universities, but at private and religious colleges as well. These trends, fortunately, are also slowly beginning to even out. Actuarial

science stands out in the area of salary. Pay is merit-based, depending mostly on the number of exams passed. Any female actuary with the drive and dedication can make it to the top.

All actuaries have the potential to be top-level executives. However, there are still embarrassingly few female actuaries at the top of many organizations. The Society of Actuaries has only one female on its nine member Board of Governors. The Executive Committee of the Actuarial Foundation is entirely male, as is the Executive Committee of the Canadian Institute of Actuaries. Two of the nine members of the Actuarial Board for Counseling and Discipline are female, and the American Academy of Actuaries has two females to eight males on its board. There is clearly much more room for female influence in these powerful organizations. We must make sure that there is nothing preventing women from reaching the top.

To get a current perspective on gender differences in mathematics, I interviewed several female actuaries. Julie DiLallo was the first actuary I interviewed. She is a Fellow of the Society of Actuaries and was employed at Lincoln Life for several years. Julie left the company last year when she had a child, and she is one of many women at her company who have made the same choice. She stated that actuarial science has definitely been a male dominated arena, but that she is seeing more and more women in the field. She related a current statistic to me as well: "I read recently that close to 50 percent of new actuarial hires are now female." Lincoln Life

is known for being "politically correct", and the seniors of the company helped make sure women were treated and paid equally. When I asked if she had faced much sexism, she said only that there were times she had not been promoted as fast as some other equally qualified men. She could not say for sure that it was because of her gender, but the thought had occurred to her. We have made much progress toward equality in the workplace since the days in the not-too-distant past when women were paid sixty percent of men's earnings for the same work.

In the end, I spoke with nine different female actuaries, and I found many things that surprised me. These women represent a wide age group, from several different employers. All but one claim Ball State University as their alma mater. They have varying levels of experience, from recent graduates to Fellows working in the field for more than fifteen years. All have seen sexism in action, to various degrees. However, when asked if they would recommend actuarial science to other young women, all answered with a resounding "Yes!." Though all love their jobs, other young women have yet to discover this fine career.

The next four women I interviewed are all employed at Lincoln Life Insurance Company. First was Sarah Showalter, the only Purdue University graduate, an employee at Lincoln since 1991, and a Fellow since 1995. She has two children and is expecting another, so she works part-time. She stated that she truly enjoys being able to contribute to her family by working and spending time with them. She has never had a female

boss, and feels that being female had not helped or hurt her career opportunities. When I asked why she felt that women are still staying away from actuarial work, she felt that part of the reason is society's perceptions of actuaries and mathematicians in general. She is very happy with her career choice and loves working part-time, but she related that she hasn't seen a significant number of females entering the field. This is clearly a field where women can excel, so we must work to find ways to get more of them involved.

Next I questioned Amy Peckinpaugh, a 1995 Ball State graduate, and soon to be an Associate of the Society of Actuaries. She shared an interesting story: She was good at math in high school, but she had her life planned as a psychologist. In one of her math classes hung a sign proclaiming actuarial science as the number one career in opportunity and security. But it meant nothing, what was actuarial science? Shortly before graduation, her high school principal, who was related to an actuary, called her to his office. He told her that she was very talented, and that she should consider a career as an actuary. She called the switchboard at Lincoln Life, spoke to an actuary, and was on her way. During her senior year of college, she was the only female in the group of students hired at Lincoln Life. One of the male students informed her; "You must be the token female." Though she has seen very little sexism elsewhere, she will remember his unnecessary comment forever. She has had mostly male bosses, but feels that this

is partially because of the low supply of women competing for high positions. She would definitely recommend this career to other young women, but stated that she is actually seeing less females enter the field. Again, we must find ways to get females interested in all careers in mathematics.

Karen Edgerton, a 1988 Ball Sate graduate, was the only female in her graduating class. She became an Associate in 1990, but fell off the student track when she began having children. Under the new exam system, she has to pass one more exam to become a Fellow. Though she is not considered a student employee, her boss is encouraging her to take the time to study for and pass the last exam. She has never had a female boss, and feels that she is not treated any differently than her male counterparts. Karen appreciates the flexibility that her job provides, and says "I can't imagine doing anything else." She has seen more females joining the field, and shared that Lincoln Reinsurance has set a goal of having a minimum of thirty percent female employees. In her opinion, women do not choose actuarial science as a career because of the personal choice to raise a family. Her company has lost seven female actuaries in the past three years because of this decision. I was surprised to hear that so many women felt they had to choose one or the other. I had to speak to women from other companies. I wanted to make sure I had discovered the real reason women stay away from demanding careers such as actuarial science.

I then turned to an alumni list to find more female

actuaries. Though they were grossly outnumbered by men, I got several responses from female actuaries. First was Jinn Lin, a 1990 graduate and a Fellow since 1996. Jinn is employed at CNA Financial Corporation, a company that stands out in its number of female employees. There are more women than men, and Jinn's boss, the Senior Financial Officer of Healthcare and Benefits, is a woman. She has never noticed a difference in the way men and women are treated at her company, and there are many women in upper-level positions to offer her guidance and support. She pointed to a lack of early education and a fear of mathematics as the reasons women stay away from these careers. She says that she is seeing more female employees and would definitely recommend actuarial science to other young females. CNA is to be applauded for its efforts in recruiting female actuaries.

Next I spoke with Amy Baker, an employee in the Cleveland office of Watson Wyatt Insurance Company. She graduated in 1994 and became an Associate in 1995. Under the new exam system, she has to pass one more exam to become a Fellow. She was directed towards actuarial science by an advisor at Central Michigan University. She says that she hasn't seen much sexism in the field, but that she did get a taste of it when she began interviewing. She, too, pointed towards family obligations as the reason that women do not reach the top of many organizations. She feels that men and women are drawn towards actuarial science in equal numbers, and would recommend this

career to any woman who started the exam process early. She is seeing more females in the field, and suggests that women get involved with math at an early age.

Elizabeth Dolan was the next actuary I contacted. She has been a Fellow since 1986 and is employed at Hewitt Associates, a consulting firm. She was introduced to this field in her high school calculus class. Dr. Beekman, the retired director of the actuarial science program at Ball State, spoke to her class about the field, which offered her a way to utilize her math and business skills. She has not noticed much sexism, and noted that clients quickly get used to dealing with a female and have a high degree of respect for her. She feels that women try harder to balance work and family and are often unable to relocate, which lends to low numbers of women in high positions. She can't figure out why women are avoiding the career she loves so much and feels that more publicity would attract more women. This is just one of the ways we can bring more women into mathematics.

Finally, I interviewed Jo Coburn, a 1984 graduate and a Fellow since 1993. She is employed at Union Central Insurance and Investments, which is about 33% female. Jo's interview was extremely revealing. When she was interviewing for actuarial positions, one interviewer asked her "What trouble do you expect to have passing exams since you are a woman?" Her first boss actually revealed to her that he didn't think the company should hire female actuarial students because "you invest all this

time and money in them and then they quit to have babies." She has had several bosses make it clear that they believe "women should be home raising children and not at work." She feels that women often do not receive top jobs because they are less likely to push for raises and promotions. She stated "We work in a man's world and are being judged by men. . .Men perceive the world differently than women. . .They put different values on the different work attributes than women do; and are more likely to promote the people who value those attributes similarly, therefore, they are more likely to promote men." Also, many women put family before work, which slows the climbing of the corporate ladder. She feels that women are greatly affected by society's view that women are not good at math. "We should start young and encourage the girls who show potential, let girls know that it is OK to be good at math," she suggested. She would definitely recommend this career to other women, as she has found great flexibility in balancing work and family. There is not much blatant sexism, but she thinks that it is the subconscious acts and ingrained beliefs that need to change. Clearly our older counterparts have been exposed to much more sexism than I have ever witnessed.

There is obviously no physical or intellectual barrier that prevents women from entering the field of math. Therefore, there must be some sort of social and cultural barrier that we must identify in order to continue making progress. The first barriers, unfortunately, are often planted by our very

own parents. When their daughters have trouble with math, many parents will soothe them by saying that math is a very hard subject. The same parents often have higher expectations for their sons, and will encourage them to work harder and do better. Parents' expectations of children can easily become part of a child's perception of self. The less girls are encouraged to develop the skills and confidence to cope with their environment, the more dependent they become upon others. At an early age, girls begin to distrust their own abilities. This is the very beginning of the journey to self-confidence that every female faces. It is up to us as parents to encourage our daughters and sons in everything they do. It is our duty to instill in them values and morals. We must teach them to practice fairness, kindness, and equality throughout their lives. We must never forget that children are a product of their atmospheres.

Teachers are another important source of gender roles and expectations in a child's life. Though most teachers support equality, it is easy to cast children into sex stereotypes. The School Library Journal reported that 84 percent of classroom verbal communication involved boys. When students fail, boys are instructed to try again while females are consoled. Girls begin to see their failures as a lack of ability, and they begin to feel that their success is due to luck rather than skill. This creates a big problem when girls have trouble with subjects like mathematics that are considered "out-of-role" for females.

The encouragement provided by teachers is very important to girls that pursue math and science. Our teachers must learn gender-equity before they can be truly excellent teachers.

Both parents and teachers have an integral role in developing the self-confidence of females. Gender differences in confidence is one of the most important factors in math performance and continuation. The 1992 American Association of University Women's report states that "Math confidence has been found to be more highly correlated with math performance than any other effective variable. Females, more than males, have been found to doubt their confidence in math. ...Gender differences in perceptions of being good at math increase with age." Sixty-four percent of third grade girls think they are good at math, compared with 66 percent of boys. Four years later, 57 percent of females and 64 percent of boys agree. The gap widens to 48 and 60 percent of boys and girls by their junior year of high school. This is consistent with the general drop in self-confidence girls experience in middle school. This loss of confidence actually precedes the drop in achievement and participation. Self-esteem is plainly one of the foundations of gender equity.

When girls experience this decline in self-assurance, the results are grave. This is precisely where women began to drop out of the mathematics pipeline. Differential enrollment patterns begin to appear when math courses become optional. Women begin avoiding higher level math classes, which limits

their career choices. The number of advanced math courses completed in high school has been identified as one of the strongest direct influences on choosing an undergraduate major. Many women let their lack of experience scare them away from mathematics.

Gender stereotypes and the media can also have an effect on the career choices made by women. It has often been claimed that women are incapable of understanding mathematics because they are "emotionally minded." I asked Julie Dilallo her opinion, and she cited sex stereotypes. She felt that women are often identified as being skilled in relations while men are considered analytical. Women then avoid math because it seems that they are not using their strengths. Math is also seen as an asocial subject, which discourages many women. Our society's biases often become internalized, as they have for women and mathematics.

We have now come to a crossroads. Women are closing the gender gap in all areas of life. We are given equal rights under all areas of the law. However, we must strive to continue towards true gender equity. We must remove the social barriers and obstacles that are keeping our nation's females out of mathematics. We must now ask ourselves: "How do we go about changing the way people think about gender and achievement in mathematics?" Clearly, the question does not have an easy answer. In fact, it is probably one of the most complex questions our society will face. Gender equity will not be

achieved in our lifetimes, but it must remain our ultimate goal.

The very first step in equality is awareness. We have to make all members of our society aware of the disparities between the genders. These strategies must be "pervasive, active, continuous, and integrated into daily instruction across the board in all disciplines," asserts Connie Noble in the School Library Journal. Before we work on making changes in education, however, we should begin at the true source of gender roles and messages: parents. Parenting courses could be offered at schools, community centers, and hospitals across the nation. Parents would learn how to boost girls' learning, self-confidence, and achievement. They would be taught to encourage the growth of intellectual self-efficacy, develop critical thinking and problem-solving skills, and build on the strengths of females in the learning process. Mothers need to become strong mathematical role models for their daughters. They must be more involved, from helping with homework to providing praise and encouragement. Most female mathematicians will reveal that early family support and encouragement had been very favorable (Fox, 197.) By starting with parents, we can help erase the negative effects of gender-bias on young females.

School is the next biggest influence upon any young child's life. It is at all levels of education that we must target and eliminate sexual discrimination. This begins with education in-services These are a perfect opportunity to train teachers to be gender-neutral. This would help to "warm up" the chilly

classroom environment that effects countless females. Guidance counselors, too, need additional education. They need to learn how to make girls more aware of the opportunities in mathematics. They can help show girls how dynamic, exciting, and aggressive math can really be. Teachers can do so many things to encourage female students. They can form a speakers bureau of women mathematicians and scientists available to young girls and donate their time and energy to helping other young women succeed. Teachers can help convince girls that math and science are not too hard, and they can show them math, science, and technology in action. Educators can illuminate the close relationship between mathematics and society. They can reveal the human dimension in math and relate problems and examples to students' experience. I had a high school calculus teacher that would always use students in the class in the examples. It was a small gesture, but it definitely helped us stay interested in the lecture. There is no end to the good that a teacher can do.

Many educators are now looking into alternative methods of instruction. This is another step that must be taken in order to achieve gender equality. We must realize that everyone, not just males and females, learns differently. Enlightened teachers are searching for new ways to change curriculum so that they can reach all students. One such good example is the Four Component System described in Teaching the Majority. In my opinion, the most important part of this system is the

Focus Sheet, a daily agenda. This gives students an idea of what will be taught during each lecture. Students know what is expected of them and what will be covered the next day. They are expected to read ahead and complete homework problems prior to class. The Focus Sheet helps to alleviate the experience gap cited in so many gender studies. It helps give all students the same background experience so that they may concentrate on mastering the material at hand. Curriculum changes can be beneficial to students from every background. In How Schools Shortchange Girls, a gender fair curriculum is defined. An unbiased curriculum requires that differences and similarities among humans are recognized. Both sexes and all races are included in a positive manner. It is accurate and representative, presenting precise data and multiple perspectives. It is affirmative and integrated, valuing individuals themselves and their experiences and needs as well. We are learning more every day about how to teach to everyone.

The next step in encouraging girls in mathematics is providing them with role models and mentors. This calls for a very serious change in school textbooks. An educator must search for a textbook that includes famous female mathematicians. Girls must be shown that they can be successful mathematicians and scientists. Learning about famous females is a positive step towards gender-equity. A textbook should also have problems and examples that encompass all activities of life. Some good examples could involve recipes, female athletes, money, and

other topics present in the lives of women. By choosing the right textbook, a teacher can help to break gender stereotypes and show all students that math is connected to their world in countless ways.

Mentors are a topic that is explored by almost every book and article about equality. There are talented women in every community from all disciplines. If they each took the time to mentor a young female, it could change the world. It is absolutely necessary for students to get to know a diverse population of professionals. There are so many opportunities in the world, and it is sad that we do not insist that our children be exposed to all of them. The American Association of University Women reports that "Meeting, getting to know, and working with scientists also reduces negative and intimidating stereotypes about the field. Providing students, especially girls, with more real-life experiences with science and scientists may make a big difference." I am positive that many women would be willing to donate their time to an organization that paired mentors with female students. Mentors can provide valuable feedback, praise, and wisdom to a young female entering mathematics or any other discipline.

One more way of getting girls interested in math is outside programs. Here they are allowed to discuss, interact, and deal hands-on with mathematics. One example is a career conference for females. Six months after such a conference, more girls were more interested in courses and careers in math than they

were before attending the conference. After a four-week program for girls in mathematics, science, and sports, a follow-up study revealed that "the girls increased their math and science course-taking plans an average of 40 percent." Furthermore, they are actually taking the classes. These programs "decreased stereotypes about people who were good in science, reduced their feelings of isolation, and strengthened their commitment to careers in math and science," (AAUW Report, 39.) Outside programs can play an integral role in encouraging girls in math.

Finally, we can get involved in the workplace. Females should make sure to learn about the sexual harassment policy in their office. They should network and get to know other females in all fields. They should strive for growth and awareness. Women should reach out to younger women and offer their wisdom and experience. We should lobby for workshops in gender equity for all employees. We need to make sure our salaries are fair and that we are given the same opportunities as men. We have much to gain from making our workplaces gender-friendly.

These intervention strategies can be best summed up in an equation presented in The Journal of Technological Studies:

Early Exposure to Technology
+Supportive Mentors and Role Models
+Information
+Willingness to Learn New Skills
+Perseverance and Tenacity
Tools Required to Embark on a Successful Math, Science, or Technology Career

All of these methods can help girls to succeed in mathematics. Each and every person can empower females by giving them the confidence they need to succeed in any endeavor. We must first raise awareness in our communities, workplaces, and schools. Then we can begin to build the self-esteem of our young females. Someday soon we will be a gender fair society, and these are just a few ways we can work to achieve our goal.

Now that we have identified the many areas that need improvement, we can begin to make a change in the way people think about mathematics and gender. Ultimately, the answer lies within us. There are so many ways to get involved. If every person would donate a little bit of their time, we could change the world. Here are a few final suggestions from the American Association of University Women's Action Guide and from the women I interviewed. These are just a few ways to get us started down the long road to gender-equality:

--Write letters to the editor of a local newspaper.

--Tell family and friends about Title IX and other gender issues.

--Contact members of Congress and ask them to support the Fair Play act which would require schools to send data on athletic participation rates to the Department of Education for them to publish each year.

--Hold math and science career days with a session for parents and faculty on gender fairness.

--Form a coalition of organizations interested in improving gender equity in schools.

--Donate time to mentor young girls.

--Teach our children about gender equity. Encourage them to grow and learn.

--Start young. Let girls know that it is normal to be good at math. Encourage all girls, especially those that show potential.

--Make a change in the way you think about gender and the way we interact. We will never achieve change in society until we learn to make change within ourselves.

Mathematics no longer has to strike fear in our hearts. Women no longer need to avoid any career. As soon as we get to work on changing gender roles and stereotypes, we will be making the world a better, more fair place for all people.

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